

## **Alison Butler**

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Using data of international trade  
in a long-run perspective as an  
indicator of environmental policy  
and  
trade

# **Environmental Protection and Free Trade: Are They Mutually Exclusive?**

Having to compete in the United States in a totally free market atmosphere with companies and countries who have yet to develop such environmental standards is inherently unfair. It puts us into a game where the unevenness of the rules almost assure that we cannot win or even hold our own.

*James E. Hermesdorf, Testimony to Senate Finance Committee  
on Trade and the Environment, October 25, 1991.*

**C**OMMENTS LIKE THE ONE cited above are being heard with increasing frequency. In fact, protecting the environment has always had implications for international trade. In 1906, for example, the United States barred the importation of insects that could harm crops or forests. Similarly, the Alaska Fisheries Act of 1926 established federal regulation of nets and other fishing gear and made it illegal to import salmon from waters outside U.S. jurisdiction that violated these regulations. More recently, a U.S. law restricting the method of harvesting tuna to protect dolphins has been the subject of a trade dispute between the United States and Mexico.

In recent years, as global warming and other environmental concerns have multiplied, environmental issues have played an increasing

role in trade negotiations, further complicating what are generally difficult negotiations. Negotiating environmental regulations multilaterally is especially problematic because of differences in preferences and income levels across countries. What's more, scientific evidence is not always conclusive on the effects of certain types of environmental degradation. Finally, environmental considerations can be used to disguise protectionist policies.

This paper examines the different ways environmental policy can have international ramifications and their implications for international trade and international trade agreements. A general introduction to environmental economics is given, followed by an analysis of the relationship between environmental policy and

international trade. The paper concludes with a discussion of the status of environmental considerations in multilateral trade agreements.

## AN ECONOMIC RATIONALE FOR ENVIRONMENTAL POLICY

The environment is used primarily in three ways: as a consumption good, a supplier of resources and a receptacle of wastes.<sup>1</sup> These three uses may conflict with one another. For example, using a river as a receptacle of wastes can conflict with its use as a supplier of resources and as a consumption good.<sup>2</sup> When either the production or consumption of a good causes a cost that is not reflected in a market price, market failures that are termed "externalities" may exist.<sup>3</sup> Such market failures frequently involve the environment.

A. C. Pigou, in *The Economics of Welfare* (originally published in 1920), presented one of the classic examples of an externality. In the early 1900s, many towns in Great Britain were heavily polluted by smoke coming from factory chimneys. Laundered clothes hung outside to dry were dirtied by the smoke. A study done in the heavily polluted city of Manchester in 1918 compared the cost of household washing in that city with that of the relatively cleaner city of Harrogate. According to the Manchester Air Pollution Advisory Board:

The total loss for the whole city, taking the extra cost of fuel and washing materials alone, disregarding the extra labour involved, and assuming no greater loss for middle-class than for working-class households (a considerable understatement), works out at over £290,000 a year for a population of three quarters of a million.<sup>4</sup>

Thus, a by-product of production—smoke—unintentionally had a negative effect on another economic activity—clothes-washing.

## Why Do Externalities Occur?

Externalities exist when the *social cost* of an activity differs from the *private cost* because of the absence of property rights. In the preceding example, because no one "owns" the air, the factory does not take into account the extra washing costs it imposes on the citizens of the town. As a result, more pollution than is socially optimal will occur because the private cost of the smoke emissions to the firm (zero) is lower than the social cost (£290,000 a year). In general, if nothing is done about negative externalities, environmental damage will result as ecologically harmful products are overproduced and the environment is overused.

To eliminate externalities, the divergence between the social and private costs must be eliminated, either by assigning private property rights (that is, ownership rights) or by direct government regulation. The approach taken often depends on whether property rights can be assigned.<sup>5</sup> The advantage of assigning property rights to an externality is that it creates a market for that product and allows the price mechanism to reflect the value of the externality.

## Example of Assigning Property Rights

Suppose a chemical factory locates upstream from a small town and emits waste into the river as part of its production process. Suppose further that the town uses the river as its primary source of water. As a result of these emissions, the town must process the water before use. Clearly there is an externality associated with the firm's use of the water—it is no longer usable to the town without cost. If property rights to the river could be assigned to either the town or the firm, then the two parties could bargain for the most efficient level of pollutants in the water.

<sup>1</sup>There are many definitions of what constitutes the environment and therefore what is environmental damage. Production pollution results from the act of producing a product. Consumption pollution arises when the act of consuming a product causes pollution. Deforestation reduces both the capacity of the earth to naturally process carbon dioxide and biological diversity. Elimination of a biological species also has environmental implications. Other things that have environmental consequences include product safety standards (such as limiting chemicals that can be used in agriculture) and soil erosion. This paper, unless otherwise noted, focuses on production pollution, the source of many trade-related disputes.

<sup>2</sup>For a more detailed discussion of these problems, see Siebert (1987).

<sup>3</sup>This paper focuses only on negative externalities. Positive environmental externalities occur when one use of the environment costlessly enhances another. For example, cleaning a river for recreational use could also increase its function as a supplier of fish.

<sup>4</sup>Pigou (1952), p.185, footnote 18.

<sup>5</sup>Even if they can, social mores or standards may prevent such an assignment. For example, people might be opposed to selling timber companies the property rights to all trees in national forests.

If property rights are assigned to the firm, the town pays the firm to reduce its pollution. The town's willingness to pay for reduced levels of pollution depends on the benefits it receives from cleaner water. Generally speaking, as the water becomes more pure, the additional (marginal) benefits to the town likely decrease. On the other hand, the firm's willingness to reduce pollution depends on the costs it incurs to reduce pollution by, for example, changing to a more costly production or waste-disposal method. Generally speaking, as the firm pollutes less, the additional (marginal) costs to the firm increase. The amount of pollution agreed upon will be such that the added benefits to the town of a further reduction in pollution are less than the added costs to the firm of the further reduction.

If property rights are assigned to the town, on the other hand, the firm pays the town to pollute. The firm's willingness to pay for the right to pollute depends on the benefits it receives from polluting. These benefits are directly related to the costs it incurs from using a more costly production or waste-disposal method. Similarly, the town's willingness to sell pollution rights depends on the costs it incurs from additional pollution. The amount of pollution agreed upon is where the additional benefits to the firm of increasing pollution are less than the additional costs to the town of additional pollution.

The Coase theorem proves that the equilibrium level of pollution is the same in the preceding cases. Furthermore, such an outcome is efficient.\* Thus, when property rights are clearly defined and there is an explicitly designated polluter and victim, the efficient outcome is independent of how the property rights are assigned.

### ***Limitations of the Coase Theorem***

The key result of the Coase theorem, that the allocation of property rights does not affect the efficient amount of pollution, has limited application. If there are multiple polluters and/or many parties affected by the pollution, the outcome can depend on how property rights are assigned. Similarly, if there are significant trans-

actions costs, such as measurement and enforcement costs, the Coase theorem may not hold.<sup>7</sup>

Assume, for example, that two towns are affected by the factory's emissions, one further downstream than the other. Suppose that the town further away from the chemical plant has lower costs associated with cleaning the water. In this case, the amount of compensation the towns would be willing to pay to reduce emissions by any given amount would differ. Thus, the allocation of property rights among the firm and the two towns would affect the outcome of their bargaining.

Suppose, instead, that more than one firm is polluting. Determining how much pollution is coming from each firm, along with ensuring that each firm lives up to any agreement, may be difficult and costly. If monitoring costs are high, the Coase theorem may not hold and the allocation of property rights again affects the choice of optimal emissions.

The lack of general applicability of the Coase theorem is not an indictment of using market-oriented incentives (which usually requires assigning property rights). Most economists believe that market-oriented solutions will lead to the most efficient use of resources because, rather than having the government attempt to estimate preferences, it allows the market mechanism to reveal them.

### ***Government Regulation***

Property rights are not always assigned because many uses of the environment are considered public goods. A pure public good is one that has two qualities: First, it is impossible or extremely costly to exclude people from the benefits or costs of the good (non-excludability). For example, even if a person does not contribute to cleaning the air, she still cannot be excluded from breathing the cleaner air. Second, the consumption of the good by one person does not diminish the amount of that good available to someone else (non-rivalry). For example, the fact that one person is breathing clean air does not reduce the amount of clean air others breathe. In this case, property rights cannot be assigned because rationing is impossible.

\*See Coase (1960). An (Pareto) efficient outcome is one in which no one can be made better off without making someone else worse off. This type of economic efficiency, however, provides no information or guidance regarding equity issues. For a graphical analysis, see Nicholson (1985).

<sup>7</sup>For a discussion of the limitations of the Coase theorem, see Baumol and Oates (1988).

While few uses of the environment are pure public goods like air, many have enough features of non-excludability and non-rivalry to make assigning property rights virtually impossible. The functions of the environment that are public goods, such as breathable air and clean water, are summarized by the term *environmental quality*.

Regulating environmental quality is difficult because the government first needs to determine the public's demand for environmental quality before deciding the efficient level of pollution. The *free-rider* problem that occurs with public goods makes this determination especially difficult. When people cannot be excluded from use, they have an incentive to understate their willingness to pay for environmental quality because they can gamble that others will be willing to pay. Similarly, if they are asked their preferences and know they will not have to pay, people have an incentive to overstate their desire for a given public good. The degree to which free-riding is a problem depends on the size of the non-rival group affected. The larger the group, the greater the free-rider problem.<sup>8</sup>

For the purposes of this paper, we will assume that to determine the "true" value of public goods, the government measures the costs of pollution reduction and the benefits of pollution abatement accurately.<sup>9</sup> Using a cost-benefit approach, the optimal outcome is where the marginal cost of pollution reduction equals the marginal benefit of pollution abatement.<sup>10</sup>

It is important to recognize that the socially optimal level of pollution is generally not zero. Achieving zero pollution would require an extremely low level of production or an extremely high cost of pollution control. In determining the optimal amount of pollution, both the costs to individuals and industry need to be taken into account.<sup>11</sup>

### ***Example of Government Regulation of the Environment: An Emissions Tax***

Recall the previous example of a firm emitting pollutants into a river. Suppose the government decides to regulate the industry because there are too many polluting firms on the river to define property rights adequately.<sup>12</sup> After determining the socially optimal level of pollution, the government imposes a per-unit tax on emissions to reduce pollution to the optimal level.<sup>13</sup>

What happens to production? Figure 1 shows the supply and demand curves for the industry's output. The effect of the tax is to shift the supply curve the distance AB (the additional per-unit cost of output given the new tax).<sup>14</sup> The price rises from  $P_1$  to  $P_2$ , and the quantity of output falls from  $Q_1$  to  $Q_2$ , which is the output level associated with the efficient emission level.<sup>15</sup> Emissions are reduced and environmental quality improves.

<sup>8</sup>How to avoid this problem is the source of vast literature in economics and is not discussed in detail here. For a discussion of the free-rider problem in valuing public goods, see Browning and Browning (1983), or any other public finance textbook.

<sup>9</sup>Significant problems face governmental agencies trying to determine the optimal amount of environmental quality. For a discussion of these issues, see Baumol and Oates (1988), Siebert (1987), and Anderson and Blackhurst (1992). For an evaluation of how successful current methods are in the United States, see OECD (1991).

<sup>10</sup>For a more detailed study of cost-benefit analysis, see Mishan (1971).

<sup>11</sup>While it is difficult for many people to think of placing a monetary value on health and life, in reality it is done all the time. For example, though many lives are lost in cars each year, people are not willing to pay the "costs" of outlawing cars to save those lives. For an excellent discussion of this issue, see Blackhurst (1977), footnote 18.

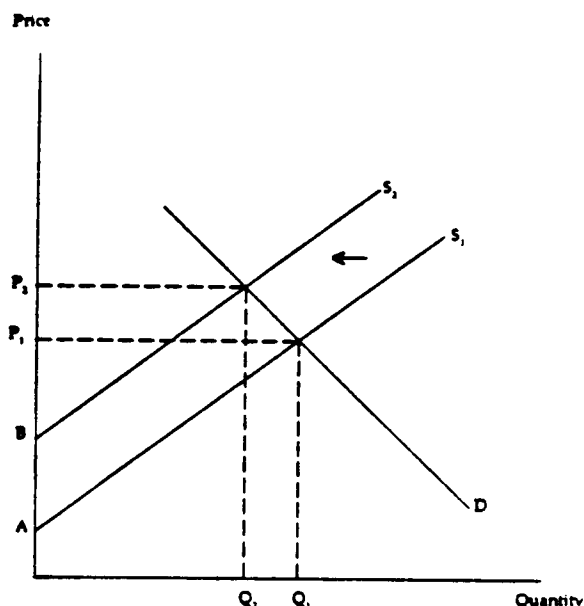
<sup>12</sup>For simplicity, we assume all firms on the river produce the same product and constitute the entire industry. This analysis can be generalized, but it greatly complicates the graphical analysis.

<sup>13</sup>This analysis assumes that the cost of reducing pollution per unit is the same across firms in this industry. One problem with imposing a per-unit tax, however, is that the cost of reducing pollution can vary significantly across firms. One innovative approach to finding the most efficient way to reduce pollution to a given level is the trading of emission permits. In this case, the government decides the maximum amount of each type of pollutant that can be emitted overall and distributes permits to firms, allowing them each a certain level of polluting emissions. The permits can be traded among firms, which allows firms to use firm-specific information to set their own level of pollution. This enables firms for which installing pollution controls is relatively inexpensive to sell emission permits to firms that find it more expensive to install pollution-reduction devices. For a discussion of the theory of emission trading, see Tietenberg (1990) and Nicolaisen, Dean and Hoeller (1991). For a discussion of the effectiveness of emission trading in the United States, see OECD (1991).

<sup>14</sup>This assumes that the per-unit emissions tax increases the cost of production proportionately.

<sup>15</sup>Other means of reducing pollution, such as a tax credit for pollution reduction, may not result in lower output in the industry.

**Figure 1**  
The Effect of an Emissions Tax on Industry Price and Output



## THE TRADE-RELATED ASPECTS OF ENVIRONMENTAL QUALITY

Pollution can have international effects in two ways. First, it might be localized within national boundaries but, through the impact of environmental policy, affect a country's international trade. On the other hand, pollution may be transported across borders without the consent of the countries affected (so-called transfrontier pollution). These two types of environmental damage have different effects on international trade and, therefore, are discussed separately.

### Why Do Countries Trade?

Countries trade because of differences in comparative advantage. The idea of comparative advantage suggests that, given demand, countries should export products that they can produce relatively cheaply and import products for which they have a relative cost disadvan-

tage. Traditional international trade models ignore externalities such as non-priced uses of the environment.

By not explicitly including the environment as a factor of production, the costs associated with using the environment are ignored. More recent economic models have extended the definition of factors to include *assimilative capacity*, that is, the capacity of the environment to reduce pollutants by natural processes. The degree to which the environment will be affected by its use or by the production of ecologically harmful products depends on its assimilative capacity. The higher the assimilative capacity, the less the environmental damage caused by the emission of a given amount of pollutants. Assimilative capacity can differ across regions and countries and thus is an important factor in determining the effects of environmental use on trade.

Traditional trade models also ignore the non-priced use of the environment as a consumption good. This underestimates the value consumers may place on the environment and therefore the cost of using the environment for other functions. These two factors can be significant in determining a country's comparative advantage.<sup>16</sup>

### Why Would Countries Choose Different Levels of Environmental Quality?

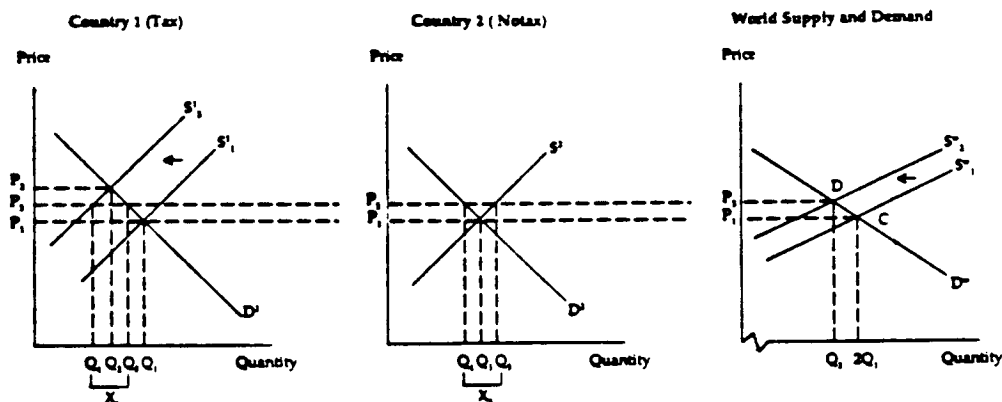
Assimilative capacity is one of the principal factors affecting a country's choice of environmental quality. In general, assimilative capacity is lower in industrialized countries because of the effects of past pollution. Less-industrialized countries often have greater assimilative capacities and thus can tolerate a higher level of emissions without increasing pollution levels. Population density and geography also affect a country's assimilative capacity. For example, the introduction of a polluting industry in a sparsely populated area, all else equal, will likely not affect the assimilative capacity of that area as much as it would in a densely populated area.

Other factors can also affect a country's willingness to accept environmental degradation.

<sup>16</sup>Recently some have suggested that the United Nations change its system of national accounts to take into account environmental resources. This can be particularly important for countries like Costa Rica that have large environmental resources (see "Wealth of Nature," January 18, 1992). A different system of national accounting could

take into account the costs of irreversible environmental destruction, so that, for example, the costs (as well as the benefits) of rapid deforestation are accurately reflected in measures of output growth and wealth.

**Figure 2**  
**The Effect of an Emissions Tax on Industry Price and Output in a Two-Country World**



For example, poor countries may put a higher priority on the benefits of production (such as higher employment and income) relative to the benefits of environmental quality than wealthy countries. As income levels increase, however, demand for environmental quality also rises.<sup>17</sup> Thus, countries with similar assimilative capacities might choose different levels of environmental quality. As the example below demonstrates, environmental policies that result from differences in countries' preferences and income levels can have significant trade effects.

### ***Environmental Policy When Pollution Is Within National Boundaries***

How does environmental policy affect trade? Recall that, in the emissions tax example, the higher production costs that resulted from the tax caused the price of the industry's output to increase and the quantity produced to fall. Assume there is a chemical industry in another country producing the same product with the same level of emissions. For simplicity, assume that, prior to the implementation of environmental controls, each industry produced just enough to meet its home demand, and the price was the same in both countries. As a result, trade did not occur.<sup>18</sup> Suppose, because of

different preferences, income levels or assimilative capacity, it is optimal to impose environmental controls in one country but not in the other. What happens to price, output and environmental quality in the two countries?<sup>19</sup>

The answer depends in part on whether the two countries can trade. If trade does not occur, the effect is the same as in the previous example. As figure 1 shows, in the country where pollution controls were imposed, the price will rise to  $P_2$  and the quantity of output will fall to  $Q_2$ , while in the other country nothing changes. Figure 2 shows the effect of an emissions tax on price and output in the two countries when trade occurs.<sup>20</sup> The reduction in supply of the chemical in the taxed country (Tax) will reduce the world supply of that product, causing the world supply curve to shift upward to the left. At the new world equilibrium D, the price,  $P_3$ , is lower than the autarkic (no trade) equilibrium price in Tax ( $P_2$ ), but higher than the autarkic equilibrium price in the other country, Notax ( $P_1$ ). At  $P_3$ , consumers in Notax demand  $Q_4$ , but firms are willing to supply  $Q_3$ . The distance  $X_2$  is exactly equal to the distance  $X_1$ , which measures the difference between what firms in Tax are willing to supply at  $P_3$  ( $Q_3$ ) and what consumers demand at that

<sup>17</sup>See, for example, Grossman and Krueger (1991).

<sup>18</sup>This example generalizes to the case where trade occurs before the implementation of environmental controls.

<sup>19</sup>This section assumes that each country is large enough to affect the world price. If the country with the emissions tax

was a small country, it could not affect the world price. As a result, the effect on output in that country would be greater than in the example above.

<sup>20</sup>This assumes prices are in the same currency, so all exchange rate effects are ignored.

price ( $Q_x$ ). As a result, Notax exports the quantity  $X_1$  of the chemical to Tax.

What is the effect on other economic variables? Consumption of the chemical falls in Notax, even though output rises. In general, because of the increased production in Notax, there will be an increase in pollution emissions in that country. How much the pollution level actually increases in Notax (if at all) depends on the assimilative capacity and the method of production used in that country. Whether the people in Notax are better off at the potentially higher level of pollution that resulted from increased production depends on that country's willingness to accept higher pollution for higher income.

Pollution declines in Tax. If the assimilative capacity is higher in Notax, world pollution will likely be lower after environmental controls are implemented. The effect on world employment is ambiguous and depends on certain country-specific variables. The terms of trade will deteriorate for the country with the emissions tax.

If the new level of emissions in each country is optimal given preferences and income, both countries are better off by trade. The taxed country is able to consume more at a lower price than in the autarkic case, while the value of total output rises in Notax. If measures of national income or wealth accurately reflected environmental damage, they would increase in both countries.

### ***Does Environmental Protection Distort Trade?***

One concern is that environmental regulation unfairly discriminates against domestic firms when they compete with firms in a country that has lower environmental standards. In the example discussed above, an externality existed in Tax but, by assumption, not in Notax. As a result, introducing environmental controls eliminated a distortion that previously existed. This changed the flow of trade, but caused all the costs of using the environment, both as inputs in production and as consumption items, to be

reflected in market prices. Thus, assuming that environmental quality was not socially optimal before protections were enacted, pollution-intensive sectors in Tax were actually receiving an implicit subsidy from those who had been incurring the external costs of pollution.

The difficulties in trying to determine the optimal amount of environmental quality within a country, as discussed above, are substantial. The optimal level of environmental quality in one country is unlikely to be optimal in another, particularly if the two countries have significantly different income levels. Attempting to impose one country's environmental standards on another by using import restrictions does not allow countries to capitalize fully on their comparative advantage.<sup>21</sup> As discussed later, it is also illegal under current international trading rules.

### ***Environmental Policy When Pollution Crosses National Boundaries***

The previous section discussed the international effects of environmental policy when environmental damage is contained within national borders. Many other uses of the environment cause environmental damage across borders, such as acid rain, which results from sulphur dioxide emissions, or worldwide, such as ozone depletion, which results primarily from chlorofluorocarbons (CFCs). Transfrontier pollution may occur in essentially four ways:<sup>22</sup>

1. A firm's production takes place in one country, but pollutes *only* in another.
2. Both countries have firms whose production processes pollute, but each country's pollution is experienced *only* in the other country.
3. Pollution occurs as a result of production in one country but the effects are felt in *both* countries.
4. Both countries pollute, and the pollution generated by each is felt in *both* countries.

<sup>21</sup>If Tax puts trade restrictions on imports of chemicals from Notax because of the lack of emission restrictions in Notax, both countries would be worse off. If, for example, a tariff was levied against imports from Notax, the earnings in Notax from exporting the chemicals would be lower. Consumers in Tax would pay a higher price and import a lower quantity as a result of the tariff. For a detailed discussion of the effects of tariffs on trade, see Coughlin,

Chrystal and Wood (1988). For a discussion of the possible application of trade and policy measures in relation to environmental problems, see Subramanian (1992).

<sup>22</sup>See Lloyd (1992).

If pollution is of form 1 or 2, in the absence of an international agreement, the polluting country has no incentive to curtail its polluting activities by implementing an environmental policy. If, instead, pollution is of the form 3 or 4, pollution may be regulated domestically. Without taking into account the pollution in the other country, however, these controls will not likely be optimal internationally. In the absence of a globally optimal international agreement, domestic policymakers have less incentive to take into account the costs imposed on a foreign country than if the costs were borne domestically. Thus, from a global perspective there will be excessive use of the environment.

### ***International Policy in the Presence of Transfrontier Pollution***

Suppose, as in case 1, the river being polluted by the chemical firm runs directly into another country and all the towns affected are in the foreign country. How is an appropriate policy determined? Previously, we assumed that a country weighed the costs and benefits of pollution, given its preferences for environmental quality, its income level and its assimilative capacity. Unfortunately, in the case of transfrontier pollution, this is no longer sufficient. In this case, domestic policymakers will be less concerned with the costs imposed on a foreign country than those borne domestically. In addition, the desired level of pollution could differ significantly between the two countries because of their preferences and income levels. Other issues contribute to the difficulties in negotiating an international agreement on pollution control. For example, should the polluter pay to reduce emissions or should the residents of the country affected by the pollution pay to induce the firm to reduce emissions?

In the early 1970s, countries belonging to the Organization of Economic Co-Operation and Development (OECD), the multilateral organization of the industrialized countries, adopted the Polluter Pays Principle (PPP) to deal with purely domestic pollution.<sup>23</sup> This principle requires that the polluter bear the cost of pollution-reducing measures. This approach, however, provides no

guidance about how to determine environmental damage or what to make the polluter responsible to pay for. For example, should a polluter be responsible for damage that has already occurred, or should it be required only to pay to reduce current emission levels? In addition, PPP offers no instruction regarding transfers between governments to resolve problems of transfrontier pollution.

As a result of an OECD conference on transfrontier pollution, it was suggested that the OECD adopt the so-called "mutual compensation principle." This proposal requires the polluting country to provide an estimate of the costs of pollution abatement for various levels of pollution, while the polluted country similarly provides an estimate of the costs of treating the damages. An independent agency determines the optimal level of pollution with these two cost functions. Given the level of pollution set by the agency and the cost functions provided by the two countries, the polluting (polluted) country pays a pollution (treatment) tax based on the cost of clean-up (control) estimated by the other country and is also required to pay for the cost of pollution abatement (clean-up) in their own country. The advantage of this approach is that it induces countries to reveal their "true" value of the environment.<sup>24</sup> Unfortunately, because of the problems inherent in determining the optimal level of pollution as well as negotiating and implementing such a proposal, the mutual compensation principle has never been used.

There are other impediments to reaching international agreements on environmental use. For certain types of environmental degradation, there is debate about how much damage is actually being done to the environment. An obvious example of this is global warming.<sup>25</sup> Many environmentalists and governments are concerned that excessive emissions of carbon dioxide, nitrogen oxide and methane gas from energy use are irreversibly warming the planet. Many others, including the U.S. government, however, feel that the evidence is insufficient at this point and are unwilling to significantly alter their environmental policy. Scientific evidence on global warming is inconclusive. An August

<sup>23</sup>These countries are the 24 main industrialized countries.

<sup>24</sup>See OECD (1976) for an analytic discussion of why this is true. For more information on the mutual compensation principle, see the discussion therein.

<sup>25</sup>For a discussion of the effects of global warming see, for example, Winters (1992) and Schelling (1992).



31, 1991, survey on energy and the environment in *The Economist* pointed out one of the difficulties with transfrontier environmental damage such as global warming: the appropriate policy may need to be implemented before conclusive proof that the damage appears, because of the cumulative effects of some types of environmental damage over time.

Nevertheless, some international agreements have been reached (see table 1) and, if the significant increase in articles, studies and conferences on transfrontier pollution are any indication, there will be additional pressures to find new ways to deal with the increasing problem of transfrontier pollution.

## NORTH-SOUTH ISSUES

One of the main reasons environmental policy affects trade is because countries are at different levels of industrialization and thus have different income levels, which can cause their optimal levels of pollution to differ. Because the interests between high- and low-income countries may differ, it is important to look more closely at these so-called North-South issues.<sup>26</sup>

Currently the industrialized countries, in general, are greater polluters than less industrialized countries and thus tend to put a relatively greater demand on worldwide assimilative capacity. One concern heard in developing countries is that industrial economies, rather than reducing their own demand for assimilative services, could impose their environmental standards on developing countries without any assistance in paying for them, thereby reducing the opportunity for less-industrialized countries to grow. As one news commentator suggests:

Developing nations are suspicious that born-again environmentalists in the North will saddle them with commitments to regulate pollution, slow down deforestation, and control population growth, all in the name of sustainable development, yet won't follow through with economic aid to improve their own productivity and employment. Meanwhile, developed nations

are reluctant to undertake radical domestic [environmental] policy changes that threaten their own economic growth.<sup>27</sup>

Other types of environmental issues have a particular North-South nature. For example, many of the world's nature preserves are in developing countries in Africa. Currently, trade in elephant hides and ivory, along with other endangered species, are prohibited under the Convention on International Trade in Endangered Species (CITES). At a recent conference on CITES in Kyoto, Japan, several African countries argued that their elephant herds are large enough to be culled without endangering the species. In addition, they argued, revenue generated by the sale of ivory and other elephant products is needed to fund future preservation.

Here, the interest of the industrialized countries, who do not have a native elephant population, is to protect an endangered species. The African countries, however, face a tradeoff between the benefits of protecting the species and the loss of revenue associated with the prohibition of trade in elephant products.<sup>28</sup> As a result, less-industrialized countries are putting increased pressure on industrialized countries to help pay for the services they are providing (such as species diversity).

In March 1992, the General Agreement on Tariffs and Trade (GATT), the main body regulating international trade, released a report entitled "Trade and the Environment" that takes a non-traditional approach to North-South problems. One hotly debated issue concerns the protection of the rainforests, most of which are located in Latin America.<sup>29</sup> Industrialized countries have moved to bar wood imports from Brazil and Thailand, for example, as a way to reduce deforestation in those countries. GATT argues that, rather than barring imports of wood products (much of which is GATT-illegal), the industrialized countries should compensate rainforest countries for providing "carbon absorption services."

Although this approach is novel, its advantage is that poorer countries are assisted with financ-

<sup>26</sup>For a more complete discussion of North-South issues in environmental economics, see Walter (1975).

<sup>27</sup>Walter Truett Anderson, in Walljasper (1992), p. 159.

<sup>28</sup>At the close of the Kyoto conference, the calls for partially opening trade in elephants and rhinoceroses were ignored.

<sup>29</sup>Rainforests are valued for, among other things, their ability to reduce carbon dioxide in the air and for the biological diversity they contain.

Table 1

## Examples of Multilateral Environmental Agreements with Trade Provisions

### Convention Relative to the Preservation of Fauna and Flora in their Natural State, 1933<sup>1</sup>

**Objective:** to preserve the natural fauna and flora of the world, particularly of Africa, by means of national parks and reserves, and by regulation of hunting and collection of species.

**Trade Provision:** prohibits the import and export of trophies unless the exporter is given a certificate permitting export. Parties shall take measures to control and regulate in each of its territories the internal import and export of trophies acquired in a manner not in accord with national law (Art. IX).

### Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere, 1940<sup>2</sup>

**Objective:** to preserve all species and genera of native American fauna and flora from extinction, and to preserve areas of extraordinary beauty, striking geological formation or aesthetic, historic or scientific value.

**Trade Provision:** provides for the regulation of trade in protected species by the issuance of export permits (Art. IX).

### African Convention on the Conservation of Nature and Natural Resources, 1968<sup>3</sup>

**Objective:** to conserve, utilize and develop the soil, water, floral and faunal resources of the African continent.

**Trade Provision:** for all species, a Party shall regulate trade in and the transport of specimens or trophies, and shall do so in such a manner as to prevent the illegal capture or killing of these. Trade in trophies and transport of specimens of protected species shall be subject to a standard authorization (i) additional to that required for the hunting, killing, capture or collection; (ii) which indicates the destination; (iii) which shall not be given unless they have been legally obtained; (iv) which shall be examined prior to exportation. Parties will make the import and transit of such specimens or trophies subject to the presentation of the authorization required under (i) and confiscate illegally exported specimens or trophies (Art. IX). NOTE: Parties are all members of the Organization of African Unity.

ing environmental protection, so that it does not come at the expense of economic development. This approach also reduces the free-rider problem that enables much of the world to benefit from the carbon absorption services provided by rainforests and the diversity of species provided by countries that are not the primary users of the environment. In addition, the approach directly protects the rainforests, rather than barring certain types of wood products in the hopes that doing so will cause the exporting countries to protect them.

Other approaches taken to improve environmental standards in lower-income, less-industrialized countries include debt-for-nature swaps. Here, foreign debt is purchased by environmental

groups and sold back to the issuing governments in exchange for investment in local environmental projects, including the purchase of land that is then turned into environmental preserves.<sup>30</sup>

## CURRENT INTERNATIONAL REGULATIONS

At present, international agreements do not allow a country to discriminate against products based on their production techniques. Under GATT, barring imports because the production methods used do not meet the standards of the importing country is illegal. This rule has come under fire recently, particularly in light of the

<sup>30</sup>For a discussion of debt-for-nature swaps and a partial list of some of these arrangements, see Devlin (1991).

Table 1 (continued)

### Examples of Multilateral Environmental Agreements with Trade Provisions

#### Convention on International Trade in Endangered Species of Wild Fauna and Flora, 1973<sup>1</sup>

**Objective:** to protect endangered species against overexploitation through international trade.

**Trade Provisions:** trade of species threatened with extinction (listed in Appendix I), and trade in species that may become endangered unless trade is strictly regulated (listed in Appendix II), is authorized by export and import permits approved by the Scientific Authorities of the Parties concerned (Articles III and IV). Species that a Party identifies as being subject to regulation within its own jurisdiction and as requiring international cooperation to control trade (listed in Appendix III) is subject to an export permit authorized by the Scientific Authority of the Party (Article V). Article XXIII permits a party to exempt itself from the requirements of the convention with regard to a specific species listed in Appendices I, II or III. NOTE: CITES builds on a long history of controlling trade in endangered species through the issue of export permits. It adds the twist of requiring an import permit for an export permit to be issued, in order to prevent circumvention to non-Parties.

#### Montreal Protocol on Substances That Deplete the Ozone Layer, 1987<sup>2</sup>

**Objective:** to reduce and eliminate man-made emissions of ozone-depleting substances.

**Trade Provisions:** trade provisions affect non-Parties only. Parties are to ban the importation of controlled substances as of January 1, 1991, and ban the export of controlled substances as of January 1, 1993. Parties are also to ban the export of the relevant technology to non-Parties. The 1990 amendments, which are not in force, require Parties to ban the importation of CFC-containing products as of January 1, 1993.

**SOURCES:** GATT (1992) and U.S. Department of State (1991).

<sup>1</sup>The signatory countries are: Belgium, Italy, Portugal, Spain, Sweden, United Kingdom, Egypt, South Africa, United Republic of Tanzania and India. For notes regarding certain countries, please consult original source.

<sup>2</sup>The signatory countries are: United States, Argentina, Brazil, Chile, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Trinidad and Tobago, Uruguay and Venezuela. For notes regarding certain countries, please consult original source.

<sup>3</sup>The signatory countries are: Algeria, Burkina Faso, Cameroon, Central African Republic, Congo, Djibouti, Egypt, Ghana, Ivory Coast, Kenya, Liberia, Madagascar, Malawi, Mali, Morocco, Mozambique, Niger, Nigeria, Rwanda, Senegal, Seychelles, Sudan, Swaziland, Togo, Tunisia, Uganda, United Republic of Tanzania, Zaire and Zambia. For notes regarding certain countries, please consult original source.

<sup>4</sup>The signatory countries are: all OECD countries except Greece, Iceland, Ireland and Turkey; Argentina, Brazil, Costa Rica, Venezuela, Congo, Egypt, United Republic of Tanzania, Zaire, Zimbabwe, India, Indonesia, Malaysia, Union of Soviet Socialist Republics and Israel, plus 73 other developing countries. For notes regarding certain countries and for Appendices I, II and III, please consult original source.

<sup>5</sup>The signatory countries are: All OECD countries except Turkey; Argentina, Brazil, Mexico, Egypt, Kenya, South Africa, Zambia, Malaysia, Thailand, Union of Soviet Socialist Republics, Bulgaria, Czechoslovakia and Hungary, plus 25 other developing countries. For notes regarding certain countries, please consult original source.

controversial tuna-dolphin dispute between the United States and Mexico.<sup>31</sup>

The justification for prohibiting trade restrictions based on the production method is to prevent countries from using such restrictions to

protect domestic industries. Unfortunately, GATT was not designed to address some of the more complicated issues of environmental protection, particularly regarding production methods that could have transborder or global

<sup>31</sup>In this case, the United States barred Mexican tuna because the process by which it caught tuna killed more dolphins than is permitted by the United States. According to GATT, however, the ban was illegal because the fishing

waters in question were not under U.S. jurisdiction. For a discussion of the tuna-dolphin case, see GATT (1992) or the original panel report.

## GATT and the Environment

GATT is a multilateral trade agreement that sets the rules for international trade, provides a mechanism by which to settle trade disputes among countries, and conducts multilateral trade negotiations (called Rounds) to reduce trade barriers. The agreement, however, is silent concerning the complications stemming from environmental policies that have trade effects. The only article that remotely deals with the environment is Article XX, which lists general exceptions to GATT rules. Under Article XX:

Subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade, nothing in this Agreement shall be construed to prevent the adoption or enforcement by any contracting parties of measures... necessary to protect human, animal or plant life or health.<sup>1</sup>

Under GATT, countries can regulate polluting firms in their own country as long as no distinction is made between domestic and foreign-owned firms. In fact, nothing in GATT restricts a government's autonomy in such things as taxation, regulation and subsidies as long as foreign and domestic firms are treated equally.

In regard to polluting consumption goods (e.g., cars that produce air pollution), it is also GATT-legal to place controls on these products, or require pollution control devices (such as catalytic converters), as long as these regulations are applied equally to domestically produced and imported products. These regulations tend to be applied equally, causing fewer trade-related problems with consumption pollution.

According to the recent GATT report on the environment, "In principle, it is not possi-

ble under GATT's rules to make access to one's own market dependent on the domestic environmental policies or practices of the exporting country."<sup>2</sup> As a result, two primary sources of conflict have arisen between environmental policy and GATT. The first is the violation of the national treatment provision, which states that foreign firms producing or selling a product in a country must be treated the same as a domestic firm (i.e., a foreign firm located in another country cannot be subject to more stringent environmental standards than a domestic firm). The second is violations of the non-discriminatory status, which states that any trade concession made to one GATT member must be made to all.<sup>3</sup> For example, the trade provisions of the Montreal Protocol stipulate different trade measures for signatories and non-signatories (otherwise known as most-favored nation (MFN) status), which is a violation of non-discrimination.

There are several ways that environmental issues could be explicitly addressed in GATT. The rules could be amended, for example, to set up a penalty system for countries that are below some agreed-upon level of environmental standards. This requires acceptance by two-thirds of the contracting parties (in which countries it thereby becomes effective) and is effective in the other countries as they accept the amendment. The difficulty with this approach is that a sufficient number of member countries must agree to the "acceptable" standards. Even if there are different provisions for developing and industrialized countries, agreement is still likely to be difficult.

Another possibility is that specific waivers may be granted to all or some of the signatory countries. This waiver requires a two-thirds majority of those voting, as long as the

<sup>1</sup>GATT (1986), p. 37.

<sup>2</sup>GATT (1992), p. 10.

<sup>3</sup>There are, however, GATT-sanctioned exceptions to nondiscrimination, such as the Generalized System of Preferences for developing countries.

majority comprises at least half of the contracting parties. Waivers, however, are not assumed to be long-term solutions, but exceptions for a limited time.

GATT could also clarify whether MFN and national treatment, which requires equal treatment for "like products," consider products that are produced with significantly different environmental standards as "like products." If not, they can be subject to different regulations. The advantage of all of these approaches is that they address environmental

issues in a transparent, multilateral way and are not used to mask protectionist policies.

The concern that motivated the recent GATT study is that trade policies justified by a trading partner's environmental policies are often simply another way to protect a domestic industry at the expense of its foreign competitors. The next set of GATT talks will likely attempt to make explicit rules about environmental policy to prevent differences in these policies from being used as a new type of non-tariff barrier.

effects.<sup>22</sup> For a discussion of GATT regulations and environmental protection, see the shaded insert at left.

GATT's recently released report on the environment attempts to address some of these issues. Some have suggested, in addition, that GATT focus the next round of talks on environmental issues (assuming the current "Uruguay Round" of talks is successfully completed).<sup>23</sup> The United Nations-sponsored "Earth Summit" in Rio De Janeiro scheduled for this spring is also an attempt to increase international cooperation on protecting the environment, particularly in regard to North-South issues.

## CONCLUSION

This article examines the role of environmental policy on international trade. Environmental policy is justified because of the nature of externalities associated with using the environment. When the divergence between the social and private costs of using the environment is ignored, polluting activities receive an implicit subsidy. Environmental regulations may change international trade, but enhance social welfare by removing this subsidy. The optimal amount of environmental protection, however, can differ significantly across countries because of differences in preferences, income and assimilative capacities.

One important concern is that countries will use environmental policies as an excuse to establish protectionist policies. As environmental

protection and environmental use take on a more transnational nature and the assimilative capacity is reduced worldwide, new agreements will have to be designed to both protect scarce resources and protect countries from being discriminated against because of how they choose to use their environmental endowments domestically. As the recent GATT report suggested, however, it is possible to protect the environment without distorting trade flows. Thus, free trade and environmental policy are not mutually exclusive but can work together to encourage both economic growth and environmental quality worldwide.

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<sup>22</sup>For a comprehensive discussion of the application of environmental exceptions under GATT, see Charnovitz (1991), and Sorsa (1992).

<sup>23</sup>For an additional discussion of why GATT should look more closely at environmental regulation, see Petersmann (1991).

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